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Regulatory Engagement and Program Design

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SPONSOR:
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U.S. DEPARTMENT OF ENERGY

Energy Storage: Federal Research Agenda

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- **Cost competitive energy storage technology** – Achievement of this goal requires attention to factors such as life-cycle cost and performance (round-trip efficiency, energy density, cycle life, capacity fade, etc.) for energy storage technology as deployed.
- **Validated reliability and safety** – Validation of the safety, reliability, and performance of energy storage is essential for user confidence.
- **Equitable regulatory environment** – Value propositions for grid storage depend on reducing institutional and regulatory hurdles to levels comparable with those of other grid resources.
- **Industry acceptance** – Industry adoption requires that they have confidence storage will deploy as expected, and deliver as predicted and promised.

Grid Energy Storage, US DOE, December 2013.

Bringing the Approach to Ground: Pacific Northwest Regulatory Workshop

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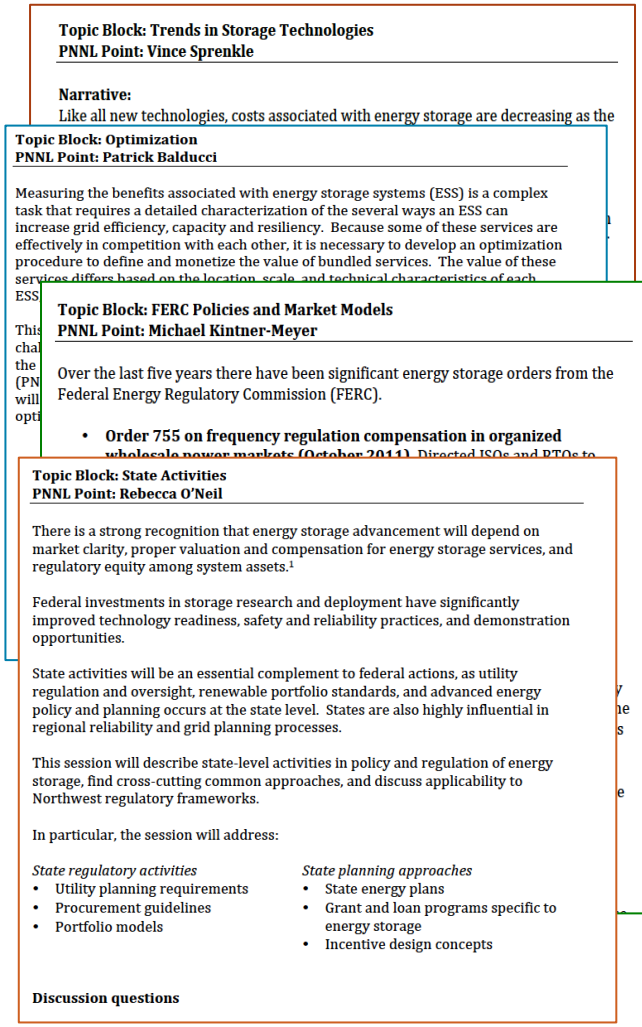
Key presentations:

- How storage works: components, definitions, system type to services
- Siting and sizing systems, value stacking and optimized dispatch in the Northwest U.S.
- Battery chemistries: cost, performance, what we know and where we still need to conduct research

What we learned:

- *State-by-state engagement*: There is value in regional outreach, but regulatory actions are state- and market-specific.
- *New tools and methods needed:* Storage is not well-characterized in existing Commission processes.
- *Independent review:* There is a need for fair and independent arbiters of information about energy storage.



Topic Block: Trends in Storage Technologies
PNNL Point: Vince Sprenkle

Narrative:
Like all new technologies, costs associated with energy storage are decreasing as the

Topic Block: Optimization
PNNL Point: Patrick Balducci

Measuring the benefits associated with energy storage systems (ESS) is a complex task that requires a detailed characterization of the several ways an ESS can increase grid efficiency, capacity and resiliency. Because some of these services are effectively in competition with each other, it is necessary to develop an optimization procedure to define and monetize the value of bundled services. The value of these services differs based on the location, scale, and technical characteristics of each ESS

Topic Block: FERC Policies and Market Models
PNNL Point: Michael Kintner-Meyer

Over the last five years there have been significant energy storage orders from the Federal Energy Regulatory Commission (FERC).

- **Order 755 on frequency regulation compensation in organized**

Topic Block: State Activities
PNNL Point: Rebecca O'Neil

There is a strong recognition that energy storage advancement will depend on market clarity, proper valuation and compensation for energy storage services, and regulatory equity among system assets.[1]

Federal investments in storage research and deployment have significantly improved technology readiness, safety and reliability practices, and demonstration opportunities.

State activities will be an essential complement to federal actions, as utility regulation and oversight, renewable portfolio standards, and advanced energy policy and planning occurs at the state level. States are also highly influential in regional reliability and grid planning processes.

This session will describe state-level activities in policy and regulation of energy storage, find cross-cutting common approaches, and discuss applicability to Northwest regulatory frameworks.

In particular, the session will address:

State regulatory activities
- Utility planning requirements
- Procurement guidelines
- Portfolio models

State planning approaches
- State energy plans
- Grant and loan programs specific to energy storage
- Incentive design concepts

Discussion questions

Regulatory Engagement and Program Design FY16 Projects

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- **Analysis of resource planning applicability to energy storage**

How well traditional resource planning tools evaluate energy storage opportunities and alternative methods to revealing energy storage system benefits within utility regulatory frameworks.

- **Direct support for state utility regulatory Commissions**

Work with Commissions and/or Staff to support docket outcomes.

- **Incentive design evaluation**

Suitability of existing incentive mechanisms to energy storage development for maximum impact, considering cost drivers for technology deployment.

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Analysis of resource planning applicability to energy storage

- Problem Statement: Traditional resource planning approaches do not provide visibility into energy storage contribution to system benefits. Resource plans evaluate the costs and risks of various resource portfolios in meeting forecasted load profiles. The purpose of resource planning is primarily reliability and adequacy, with some accounting for flexibility.

- Challenges with IRP common practice revealing energy storage benefits:
  - Resource plans are not designed to look at location-specific benefits that accrue to the transmission or distribution system (e.g. deferral).
  - System models are not intended to review services on short-term time intervals, often not accommodating sub-hourly services.

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Analysis of resource planning applicability to energy storage

- Objective: a report that provides state Commissions and Staff with perspective on how well traditional resource planning tools evaluate energy storage opportunities, and describes alternative methods to revealing energy storage system benefits within *existing* utility regulatory frameworks that support utility decision-making and investment.

- Builds on and sharpens available literature (Bhatnagar 2012; Dragoon 2014) for the applied purpose of regulatory engagement.

- Final report in FY17
  - Formal review from committee of state Staff and industry.
  - Tool to change common practice and spur new investigations of energy storage.

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Direct support for state utility regulatory Commissions

- Diverse approaches to energy storage evaluation in regulatory forums observed:
  - R&D set-aside
  - Resource planning
  - Required procurement
- Strategic selection of states
  - FY16 support focused on education on technology, performance characteristics, and anticipated costs.
- Continuity in FY17
  - Discussions with several states on support (WA, OR, NV, HI, OH)

Incentive design evaluation

- Problem Statement: Traditional energy efficiency and renewable energy programs provide incentives on energy saved or generated. This architecture does not fit a storage system, which provides benefits such as time-shifting, frequency regulation, or absorption of energy.
  - Currently incentives and property tax exemptions are very modest and associated with renewable energy projects.
  - There are significant proposals to establish storage incentive programs at the federal and state level.

Incentive design evaluation

- Objective: a report summarizing existing and proposed incentives for energy storage and providing initial findings on the suitability of incentive mechanisms to energy storage development for maximum impact, considering cost drivers for technology deployment.

- Initial Findings
  - Production based incentives (Renewable Energy Certificates, Production Tax Credits) are poorly suited to storage applications.
  - Competitive grant programs are useful to underwrite larger project investments, support learning objectives, and hedge against risk in a growing innovation industry.
  - Open incentive programs are dramatic drivers and require thoughtful design and calibration with supply chain, delivery contractors, and needed approvals.

Acknowledgments

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